McKinsey & Company

Scaling Modular Construction Across ASIA

International Construction Week Malaysia

October 2025

Agenda

Latest perspective on productivity in construction

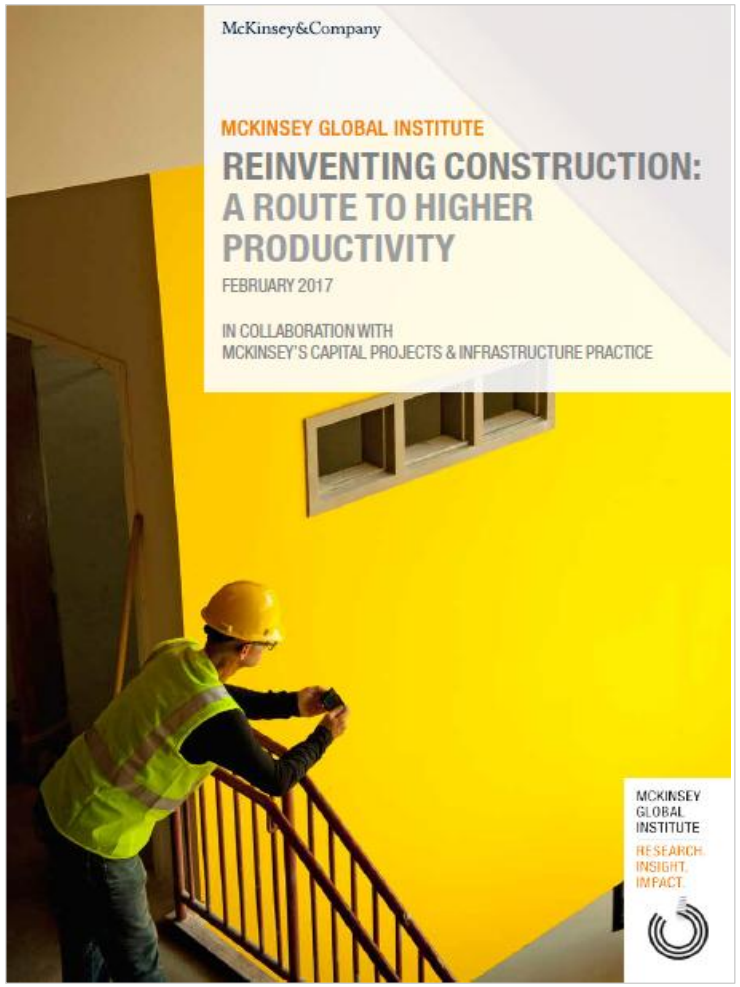
Putting the Pieces together – *How to succeed in Modular Construction*

Agenda

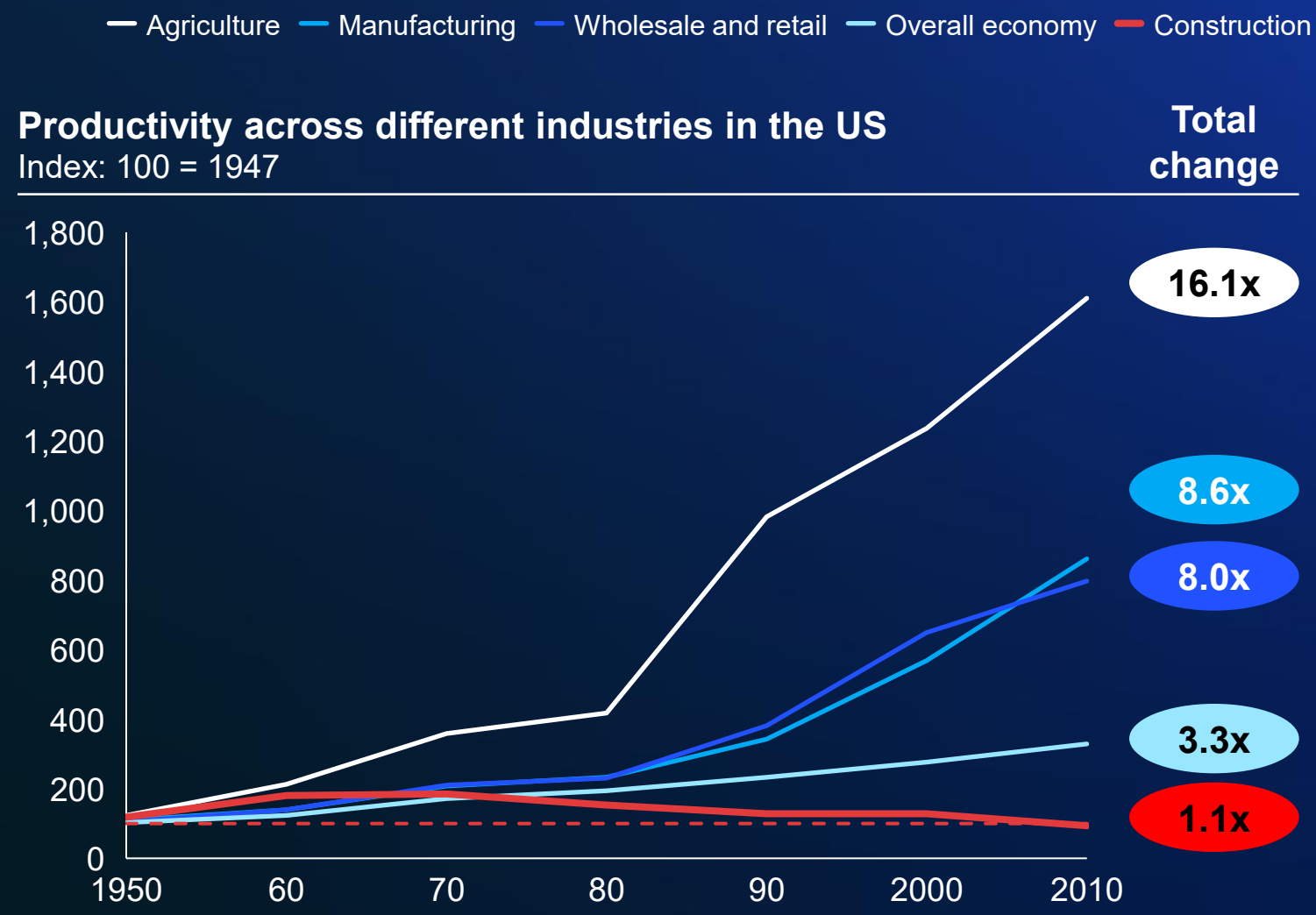
Latest perspective on productivity in construction

Putting the Pieces together – How to succeed in Modular Construction

In 2017 we published a report about construction..

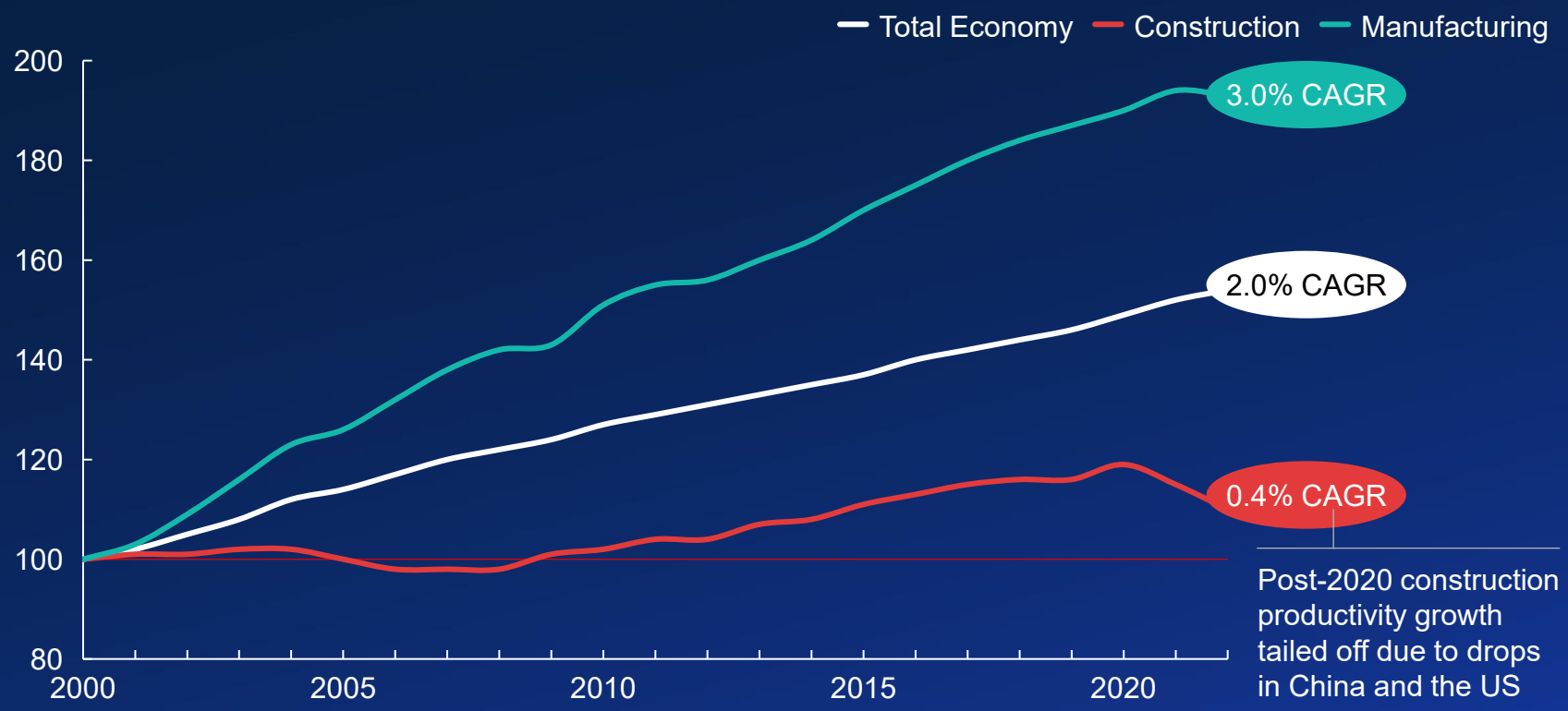


.. Which showed that the construction industry has seen close to no productivity growth the last 70 years

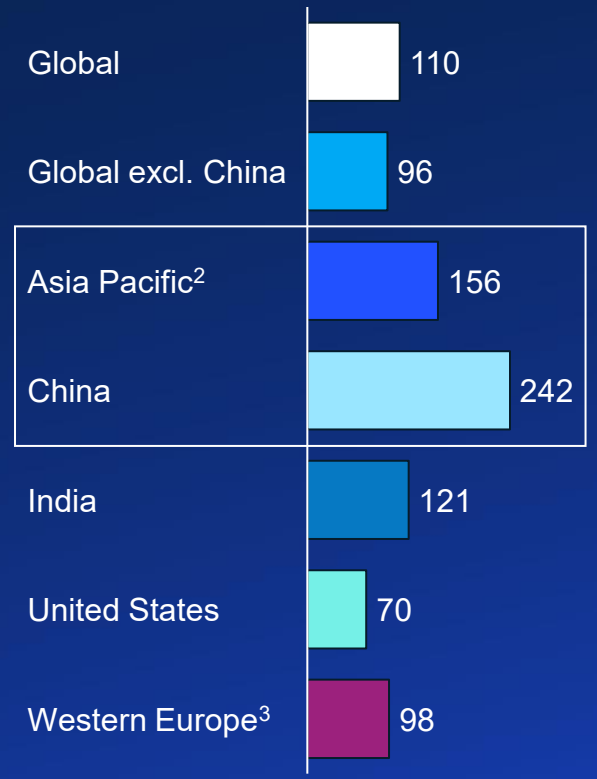


Since then, the global growth has remained flat despite digital adoption – Asia is the outlier having experienced some productivity growth

Real gross value added per hour worked (global)[1]
Index; 2000=100



Construction productivity
2022[4] relative to 2000

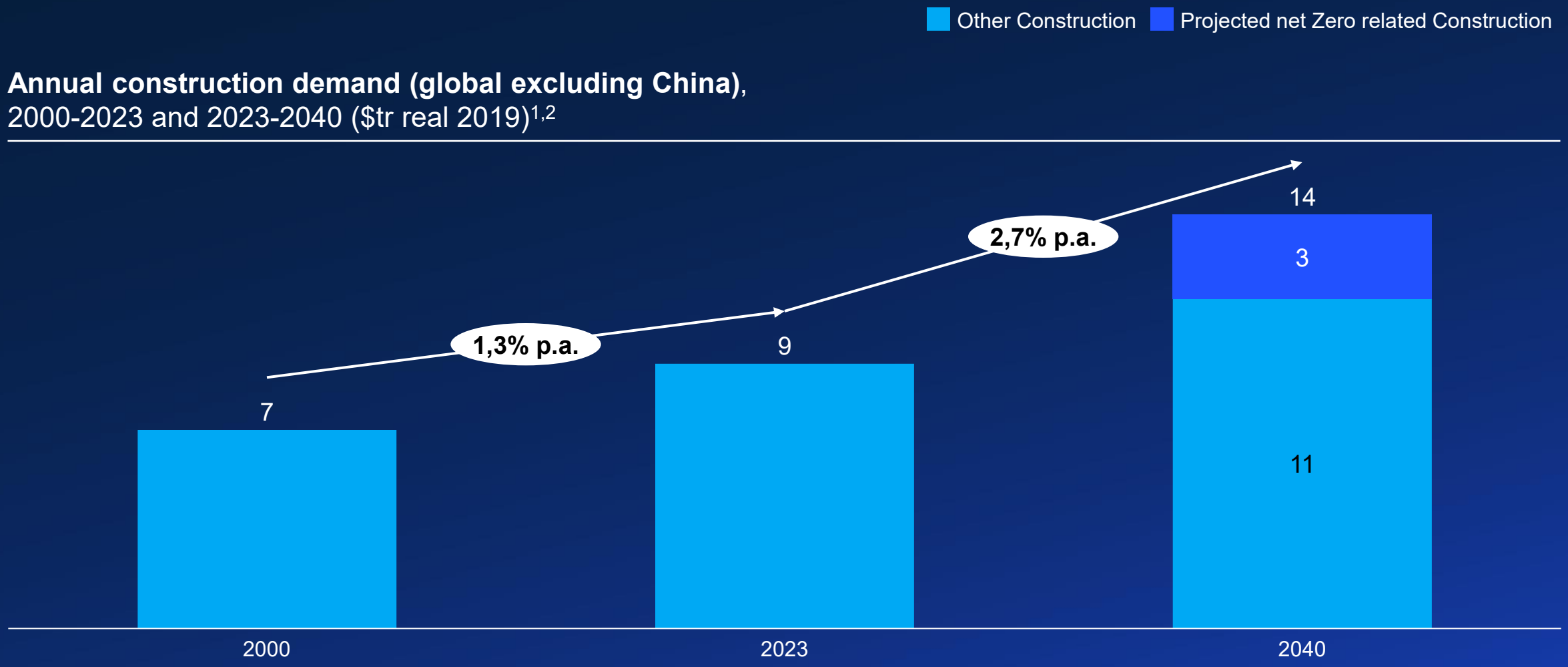


1. Includes 42 countries with sufficient data availability, that account for >90% of 2022 construction VA
2. Asia-Pacific: Australia, China, India, Indonesia, Japan used as a proxy.
3. Western Europe: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom
4. Latest data (2021) used for Asia Pacific, China, India

Source: OECD; ILO, World Bank; local statistics agencies, McKinsey analysis. Methodology: Sectors as defined by ISIC classifications. Productivity indexed as cumulative sum of YOY percentage changes for individual countries pro-rata to VA share

Looking forward, Construction has to double its output to meet objectives for growth, net zero, infrastructure and housing

Annual construction demand (global excluding China), 2000-2023 and 2023-2040 ($tr real 2019)[1,2]



1. IHS Markit
2. McKinsey Global Institute net-zero estimates, assuming all net-zero capex in power, buildings, fossil fuels, and industry directed to construction (and not to machinery and other physical assets), conversion rate from sales to VA for net-zero projected from IHS Markit estimates for construction

Note: estimates calculated according to 10 largest economies in terms of construction (~69% of global output) and generalized across global economy

In developed countries, overall and construction workforce growth is slowing down and declining

X.X% Labor force outlook CAGR,2022-2040 (World Bank) **X.X%** Historic construction labor force CAGR, (2013-2018)

Labor workforce (15-64) growth[1]
Index 2000-2040, 2000=100

Labor force historic — Labor force projection[2] — Construction labor force historic

In developed economies, overall and construction workforce is slowing down..

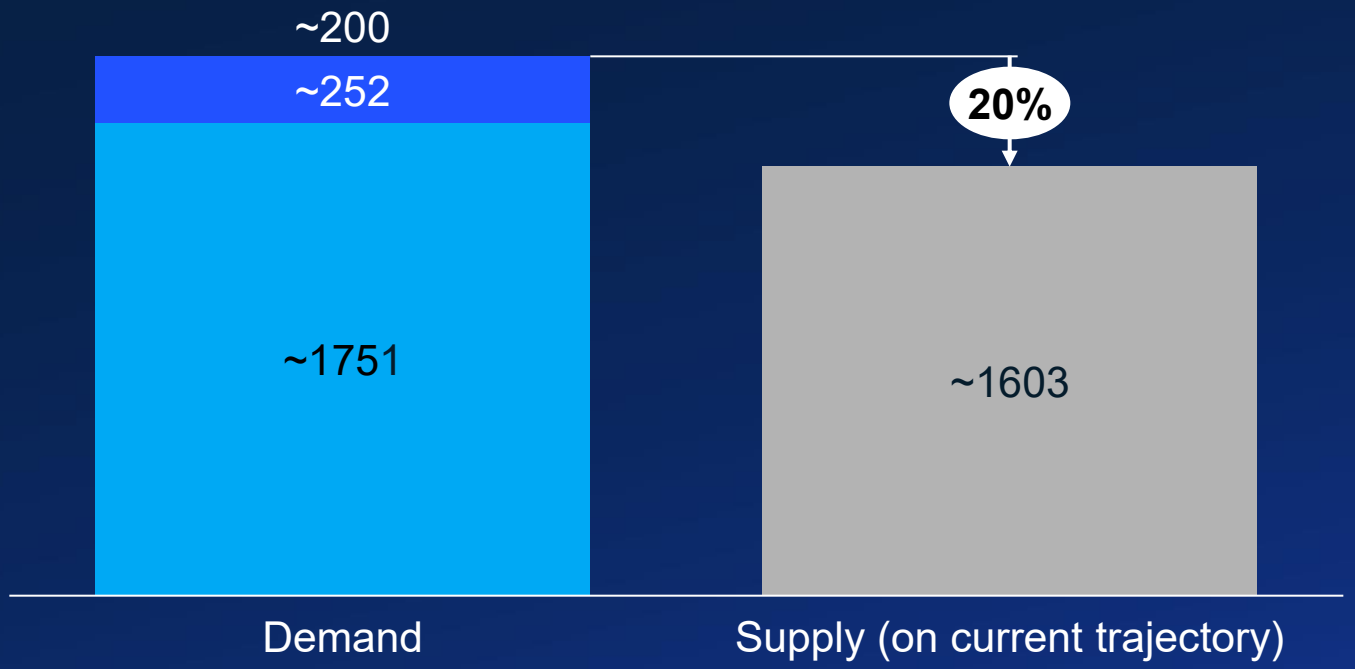
1. Workforce projection based on United Nations 80% upper bound scenario, 15-64 age; as total workforce projection

2. Assumption that construction workforce follows same trend

Source: McKinsey Capital Excellence Practice analysis using sources from World Bank, United Nations, ILO

On current trajectory, the sector may be unable to meet demand pertaining to growth, infrastructure, net zero, housing

Cumulative construction output, 2023-2040 ($tr, real 2019, excluding China)



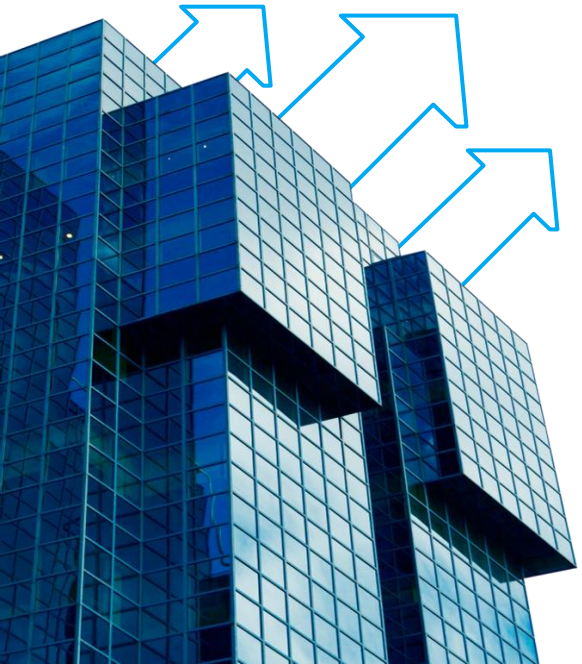
~$40 trillion

shortfall in construction output by 2040 assuming continued productivity stagnation and sector employment in line with overall workforce growth

1. IHS Markit estimates net of estimated net-zero spend to be redirected from existing construction projections based on McKinsey Global Institute forecast (see footnote 2),
2. McKinsey Global Institute net-zero estimates, assuming 25% net-zero capex directed to construction (and not to machinery and other physical assets), conversion rate from sales to VA for net-zero projected from IHS Markit estimates for construction
3. Projections assuming current output indexed to workforce trends and unchanging productivity, workforce trends based on World Bank projections for population aged 15-64. Estimate calculated according to 10 largest economies in terms of construction (~69% of global output) and generalized across global economy

Source: McKinsey Capital Excellence Practice analysis using sources from IHS Markit, World Bank, United Nations, ILO

It feels like we have made progress – why haven't construction productivity numbers improved?

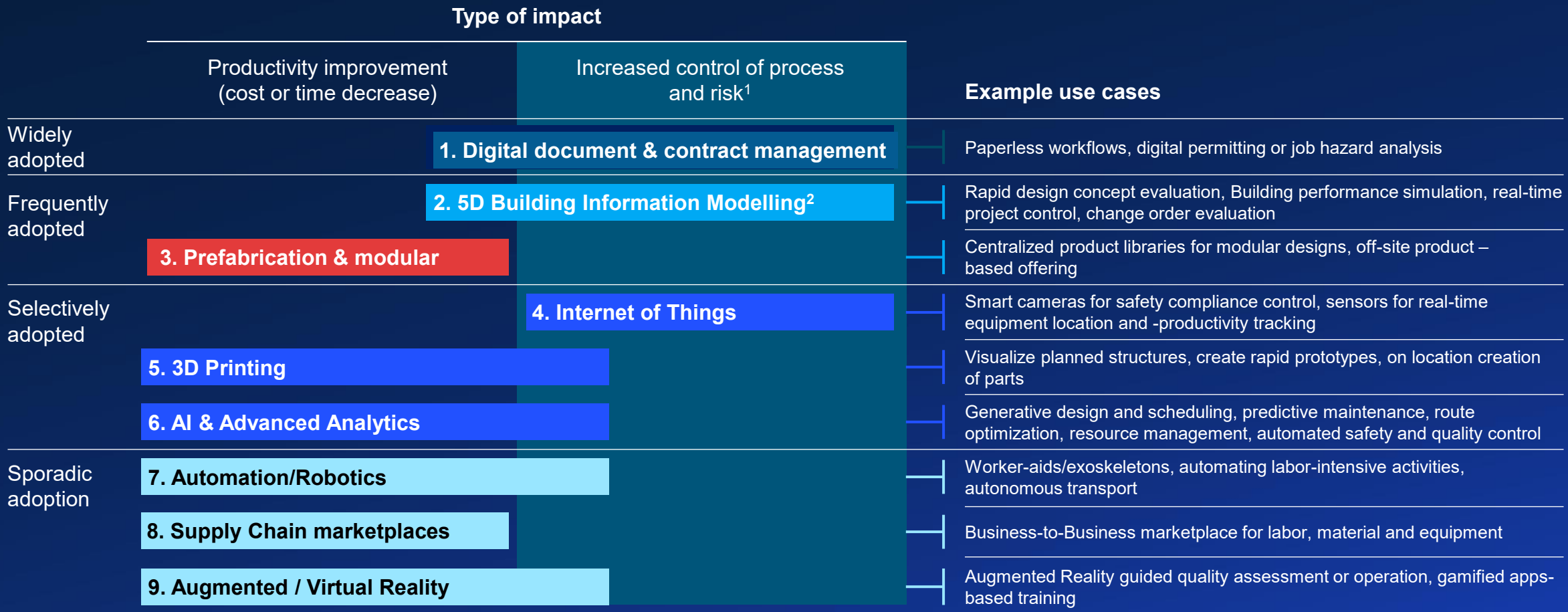


- Technology uptake has been slow and mainly **focused on control rather than productivity**
- The industry **struggles to scale improvements** from one project to the entire portfolio
- The industry has passed on **results of productivity improvements**
- Tender dynamics and low margins **limit investments in productivity efforts**
- Projects have become more complex, exposing **construction companies to more risks**
- Labor market tightness and **workforce churn** have affected skill levels
- **Timely delivery** takes priority over productivity improvements

Innovations have often not been adopted at scale or focused on control more than productivity

Focus today

9 mature innovations in the Construction sector (non-exhaustive)



1. Includes control, monitoring, measurement, modeling, safety assurance
2. BIM is widely used in major firms for the design and construction phases, "true" end to end usage still not applied broadly

Source: From start-up to scale-up: Accelerating growth in construction technology, McKinsey, 2023; Rise of the platform era: The next chapter in construction technology, McKinsey, 2020; McKinsey Analysis; Expert interview

Agenda

Latest perspective on productivity in construction

Putting the Pieces together – *“How to succeed in Modular Construction”*

We've built a comprehensive overview of the modular construction industry and recently published a perspective on how to succeed

The insights is built from McKinsey's modular construction database…

700+ **Companies** – ranging from 'modular only' players in 2D & 3D to large (traditional) construction companies with activity in modular construction

50+ **Countries** – including production- and sales coverage

…Combined with insights from interviews with industry leaders and our work in the sector

IMPACT HOUSING™ TopHat BURO HAPPOLD MESTERGRUPPEN

MODULAR BUILDING INSTITUTE SEKISUI GOLDBECK BOUTIQUE BATIMENT INTERNATIONAL

And knowledge build from 100+ Client studies within modular construction

Resulting in our most recent publication on modular construction

1. General overview of modular construction market

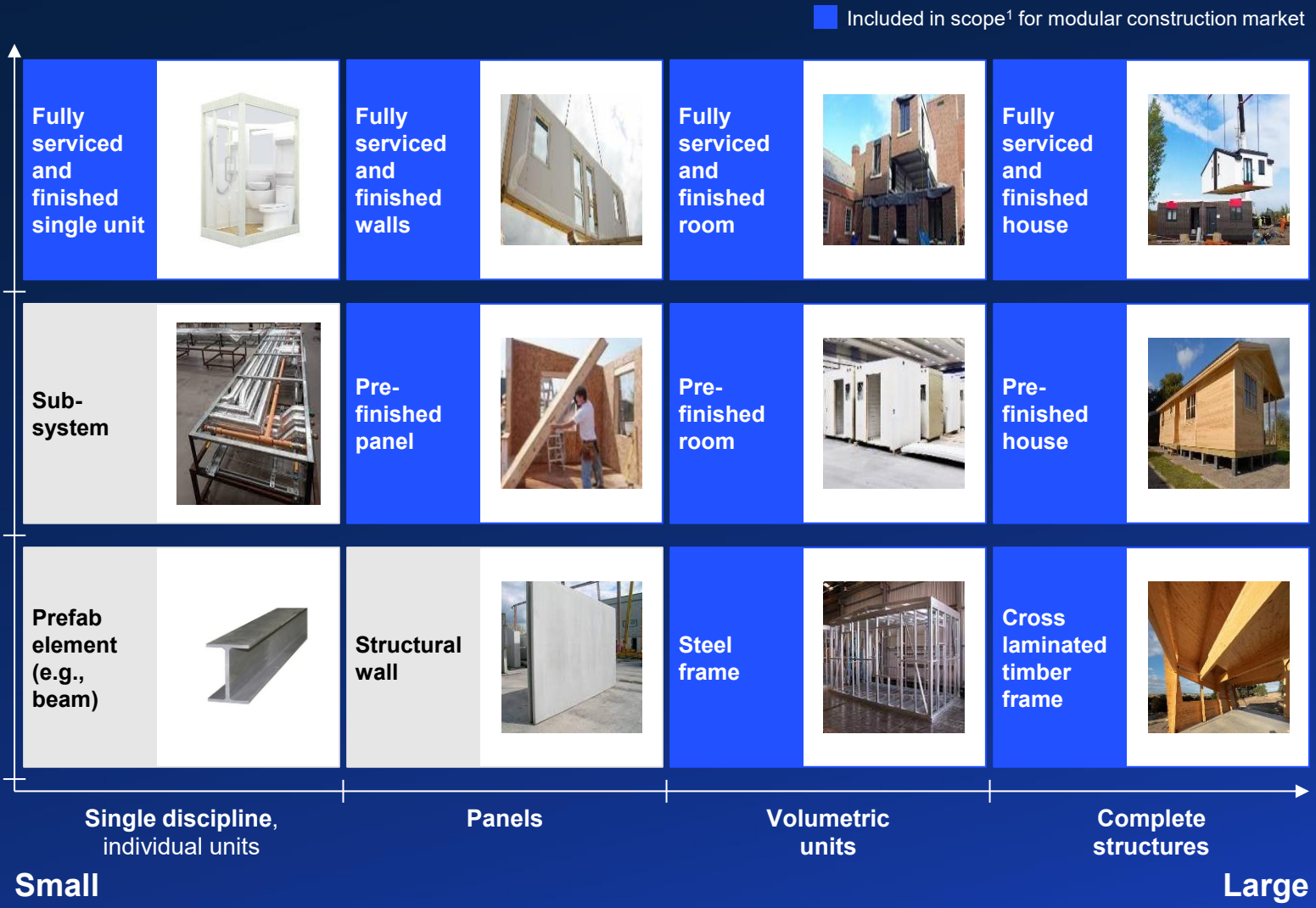
2. Current state of modular construction industry

3. What it takes to succeed

What we mean by modular construction

Modular construction is a building method that **involves manufacturing standardized components of a structure in an off-site factory and then assembling them onsite**; the solution covers a range of different approaches and systems from basic 2D panels to fully serviced and finished houses

Modular construction requires a change to the entire traditional construction value chain in order to be leveraged effectively, from the way plots are developed, and buildings are designed to how logistics and construction activity at site works



1. Including modular construction companies renting out volumetric components

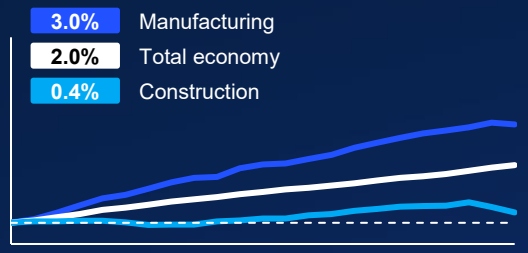
Modular construction addresses several of the key challenges in the construction industry

Potential uplift

Current state of the construction market and how modular construction can uplift efficiency

Slow productivity improvement

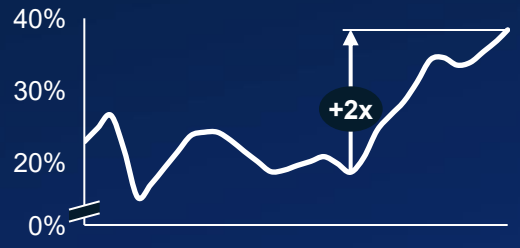
0.4% **annual productivity growth** over last 20 years



(20-45% cost reduction possible at the back of productivity improvement**)**

Global labor shortages

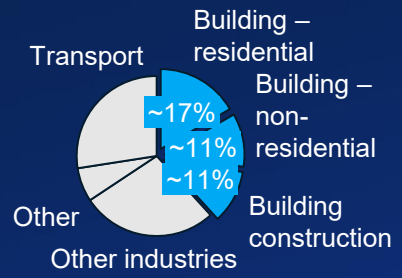
+2x Share of **construction enterprises affected by skilled labor shortages**



20-30% lower resource use mainly driven by on-site labor advantage

Buildings contributing to ~40% of global CO2 emissions

40% **Share of CO2 emissions,** globally



Reduced CO2 emissions with more efficient process leading to reduction in wastage, water and energy use

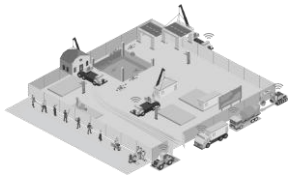
Housing shortage in many geographies

Up to **50%** faster construction as a result of prefabricated components

Source: Oxford Economics; GlobalData; OECD; WIOD; GGCD-10; World Bank; BEA; BLS; national statistical agencies of Turkey, Malaysia and Singapore; Rosstat; Bloomberg; New York Post; Centre for Cities; ifo Institute; ifo Konjunkturumfragen; Construction: NAICS 23, Survey of 400 construction-industry CxOs; expert interviews; BLS

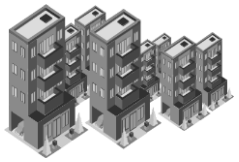
However, the market is currently only a fraction of its ~3.3 – 5 USD trillion potential

Total Construction Market



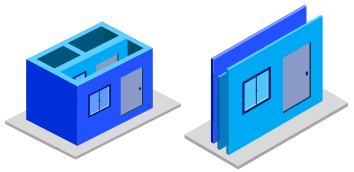
The full newbuild market

Total Modular Construction market potential

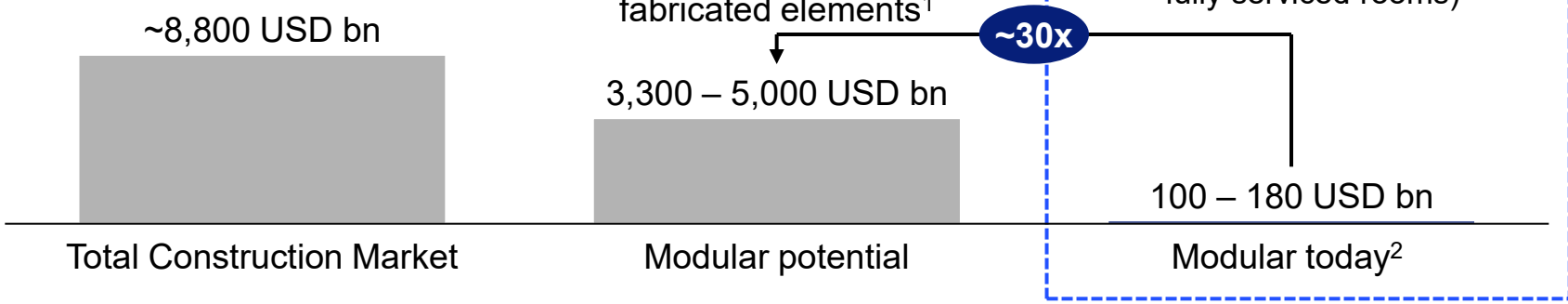


The full potential that could be addressable by modular construction of the traditional on-site construction and simple pre-fabricated elements[1]

Modular Construction market today



Today's penetration of pre-fabricated modules that are assembled on site, both **2D structures** (e.g., fully finished walls) and **3D modules** (e.g., fully serviced rooms)



1. Excluding not addressable building types (such as Civil Engineering), nonaddressable process steps (e.g., groundwork), and selected areas on the construction not suited for modular (e.g., open communal areas, outdoor paths)
2. Inherent ambiguity in how to define the modular construction market, here incl. volumetric units (3D) and panels (2D)

Source: GlobalData; Euroconstruct; SCB; MarketsandMarkets; Expert interviews

The modular construction market shows significant potential for growth, given that it currently accounts for only 2-3% of its total potential

Modular construction has developed and can now deliver high-quality buildings

Selected examples

From	To
Typically, lower quality and only suitable for temporary or “affordable” homes	Strategic use of modular construction significantly enhances development quality across various asset classes, including hotels and high-end residential buildings
Designing in modular is highly constrained i.e., geometric limitations	Various typologies and components can be modularized in a building (e.g., bathrooms) and are not limited by traditional design methodology
Only suitable in low to mid-rise buildings (e.g., up to 10 floors)	Several residential buildings of various heights have been constructed using modular construction techniques in recent years, e.g., Ten Degrees.

Source: Expert interviews, Press search, Company website

Several larger projects are now leveraging modular construction to execute in record time

TEN DEGREES
CROYDON

1.500 volumetric units

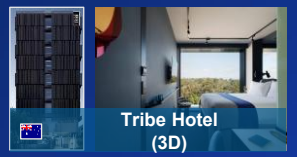
40 stories tall – worlds highest at the time

26 months delivery time

TRIBE

63 stacked prefabricated modules over seven levels

15 months construction process



Development in data, technology and manufacturing is finally allowing modular construction to deliver on its promise

Key enablers for modular construction

Data availability and analytics	• **Building component and material data structured to be leveraged** in building system and track emissions and cost data • **Digitizing construction codes, rules and regulation** which eases scaling across geographies
Access to new technologies	• **Technology allowing for software integration across the value chain** (e.g., integration between Revit and manufacturing systems producing CNC instructions) • **Tools for logistics and onsite operations has improved significantly** (e.g., logistics systems with full transparency across)
Significant aesthetics improvement	• **Better design tools, material knowledge and architectural development** has allowed for more appealing aesthetics and functional rooms (e.g., facades)
Growing industrialized construction ecosystem	• **Better collaboration across the value chain** allow for longer-term partnerships which increase profitability
Decreasing cost of manufacturing, design and logistics	• **Costs are decreasing as a result of maturing technology and logistics systems,** while processes are becoming more efficient by internalizing learnings from ongoing projects

Sources: Expert interviews

1. General overview of modular construction market

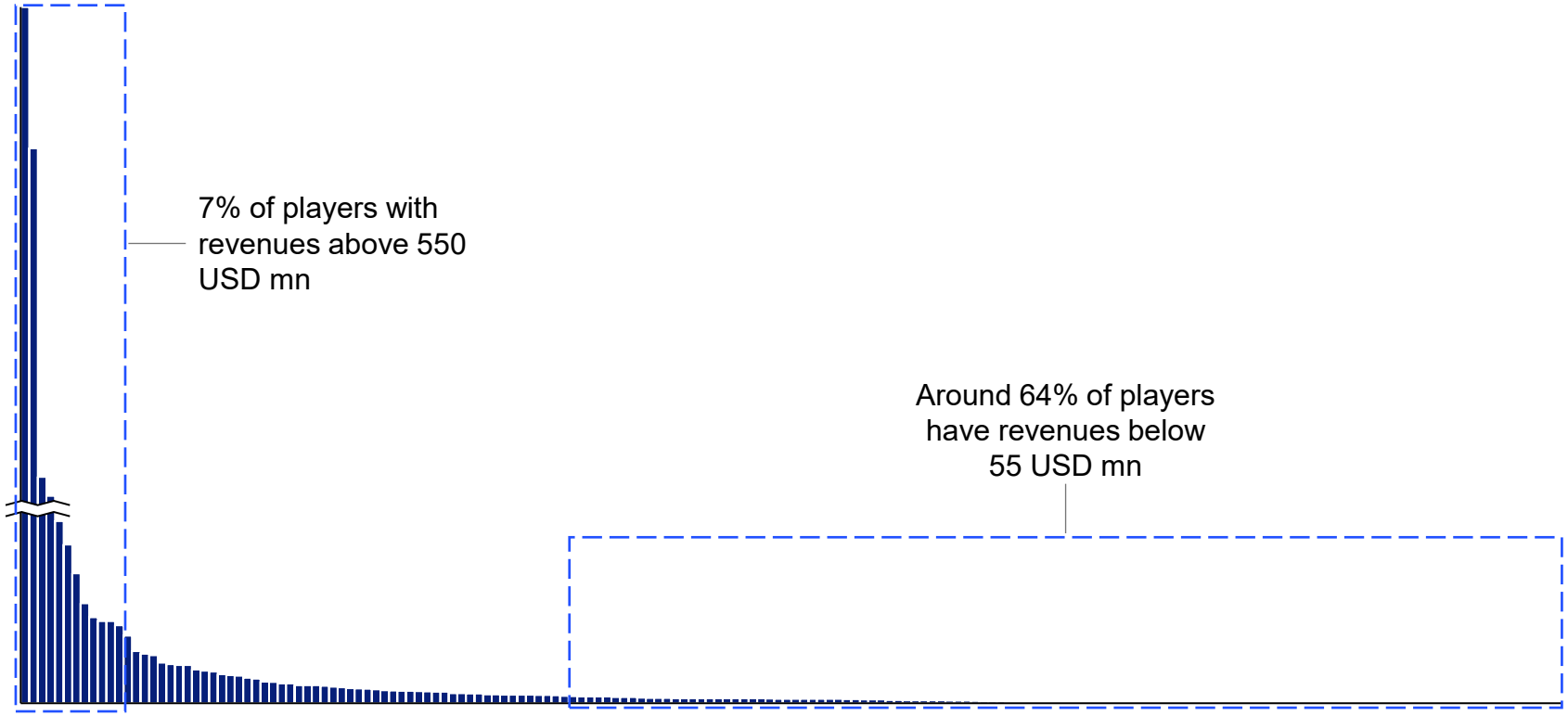
2. Current state of modular construction industry

3. What it takes to succeed

The industry is fragmented with a long tail of smaller players and a few larger companies

Preliminary

Revenue distribution modular players[1], USD mn



1. Based on companies in the database with 2023 financials available and with sales business model only, N=180

Source: McKinsey Modular Construction proprietary database, April 2025

Key insights

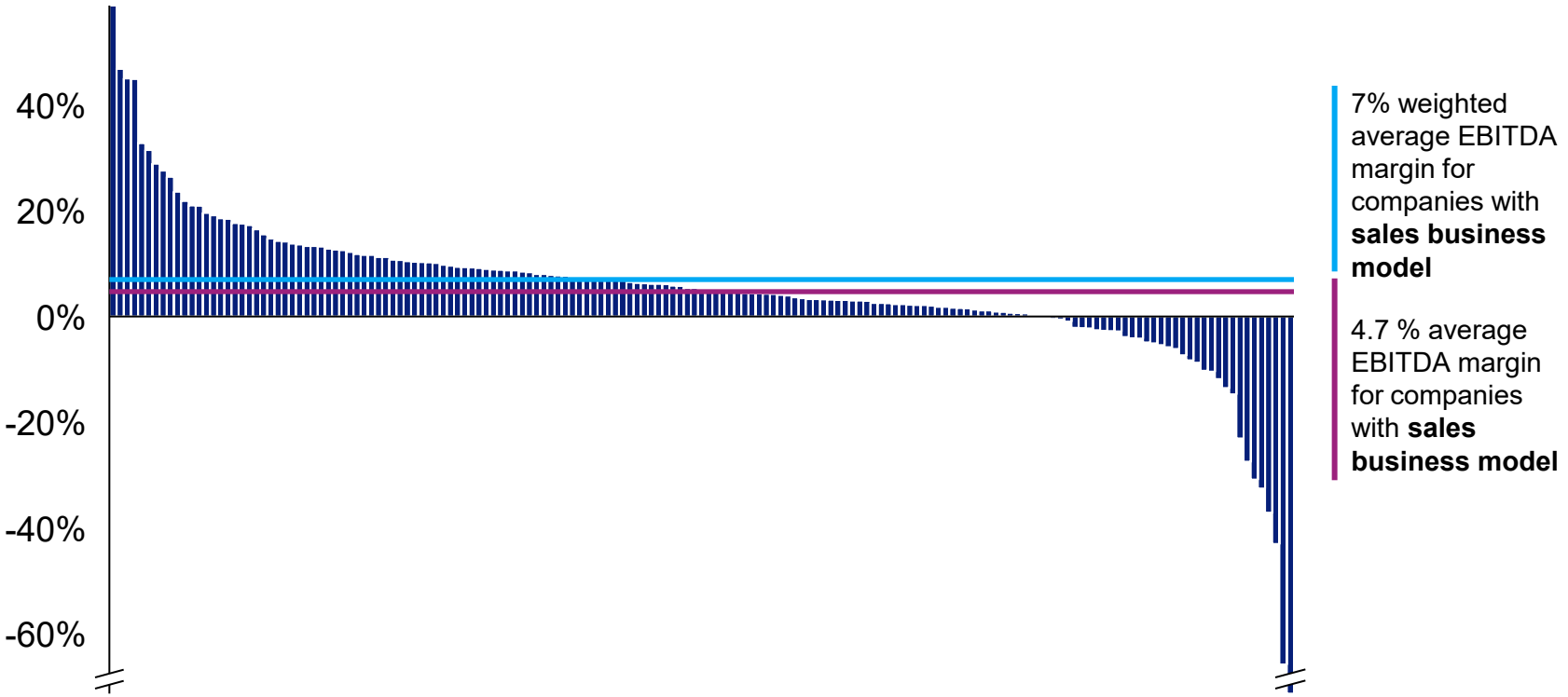
The industry is highly fragmented, with a long tail of smaller players suggesting a diverse competitive landscape and numerous niche opportunities

The largest players hold a significant share of the market, indicating substantial concentration and potential economies of scale

Significant variability in profitability among companies

Preliminary

EBITDA margin distribution[1], %



1.Based on companies in the database with 2023 financials available and with sales business model only, N=165;
2.EBITDA-margin weighted based on revenues
3.Not adjusted based on revenues

Source: McKinsey Modular Construction proprietary database, April 2025

Key insights

Profitability varies significantly across the industry

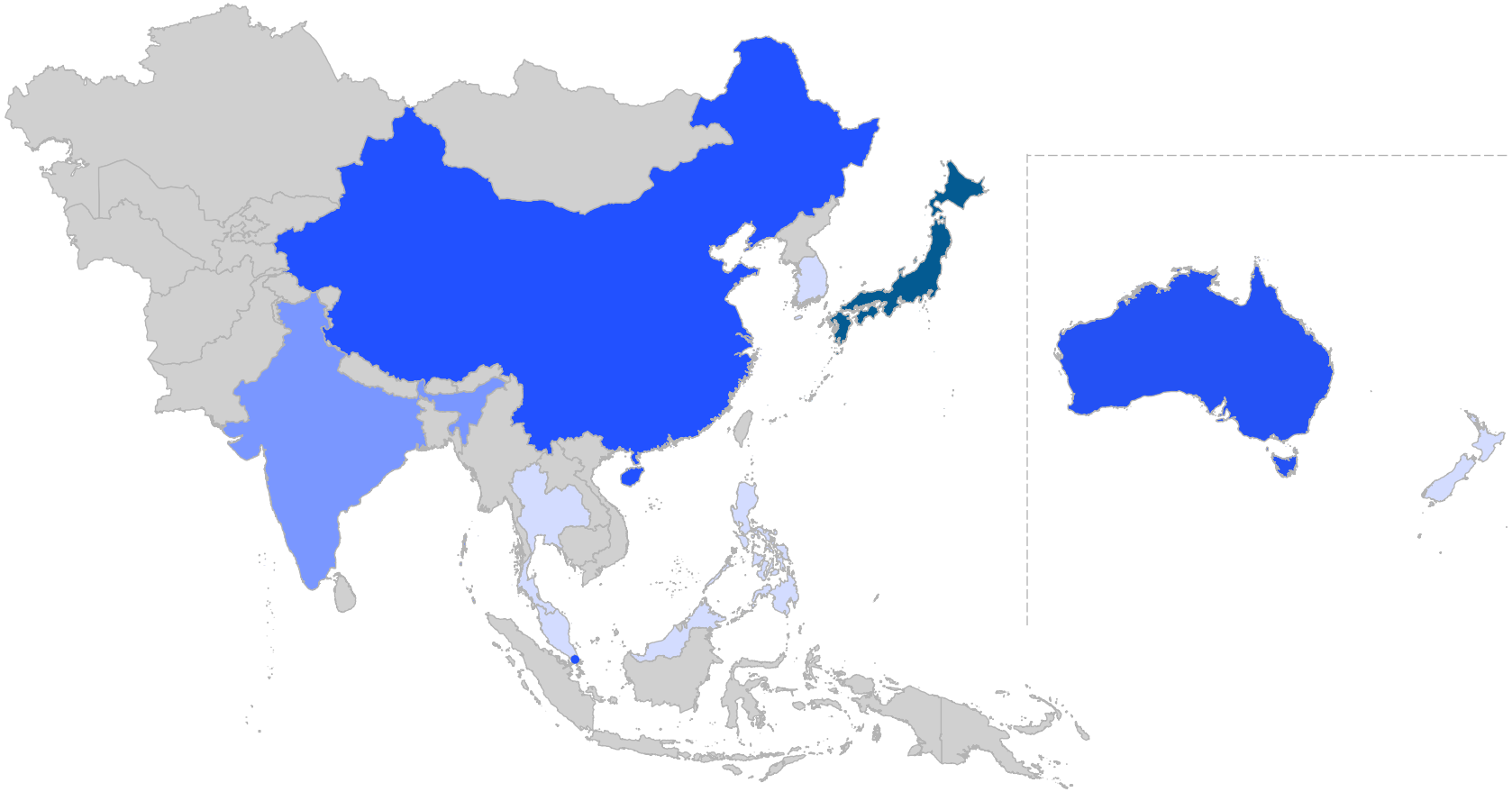
7% weighted average[2] EBITDA margin for companies with **sales business model**

4.7 % average[3] EBITDA margin for companies with **sales business model**

Higher EBITDA margins for larger companies may be attributed to potential economies of scale, improved operational efficiencies, stronger market positioning, and greater bargaining power

Most modular construction companies in Asia identified in Japan, China and Australia

Number of modular construction companies identified with HQ in each country



Companies operating in modular construction can be segmented across 7 dimensions

Preliminary

Share of companies

X Deep dive | High share | Medium share | Low share

	Dimensions	Description	Strategic option space					
A	**Value chain presence**	Dependent on value chain presence, six key archetypes have been identified	Integrated modular developer	Contractors with modular capabilities	Modular "EPC"	Modular manufacturing and assembly	Modular manufacturer	Specialized modular[1]
B	**Building types**	Distinct building types to serve needs of different end-user markets	Housebuilding (Single family homes)	Residential multi-units	Hospitality	Commercial (retail, office)	Public (Education, Health)	
C	**Material choice**	Main structural material leveraged for modules	Timber	Steel	Concrete	Mix of materials		
D	**Product type**	Range from 2D panels to fully finished 3D modules	2D	3D	Pods[2]			
E	**Building complexity**	Range from standardized one story buildings to taller residential projects, and buildings with specific requirements (e.g., hospitals)	Low complexity	Medium complexity	High complexity			
F	**Business model**	Build permanent buildings in a sales model, temporary for rental model, or a mix	Sales	Mixed				
G	**Geographical presence**	Serve local, regional or global markets. Regional and global play incl. several factories or longer distance logistics	Locally	Regionally	Globally			

1.Cluster of several different types of companies | 2. Bathroom and/or kitchen

Source: McKinsey Modular Construction proprietary database, April 2025

A. Most companies act as modular EPCs, manufacturers & assemblers or as specialized modular companies

Preliminary

Presence in value chain

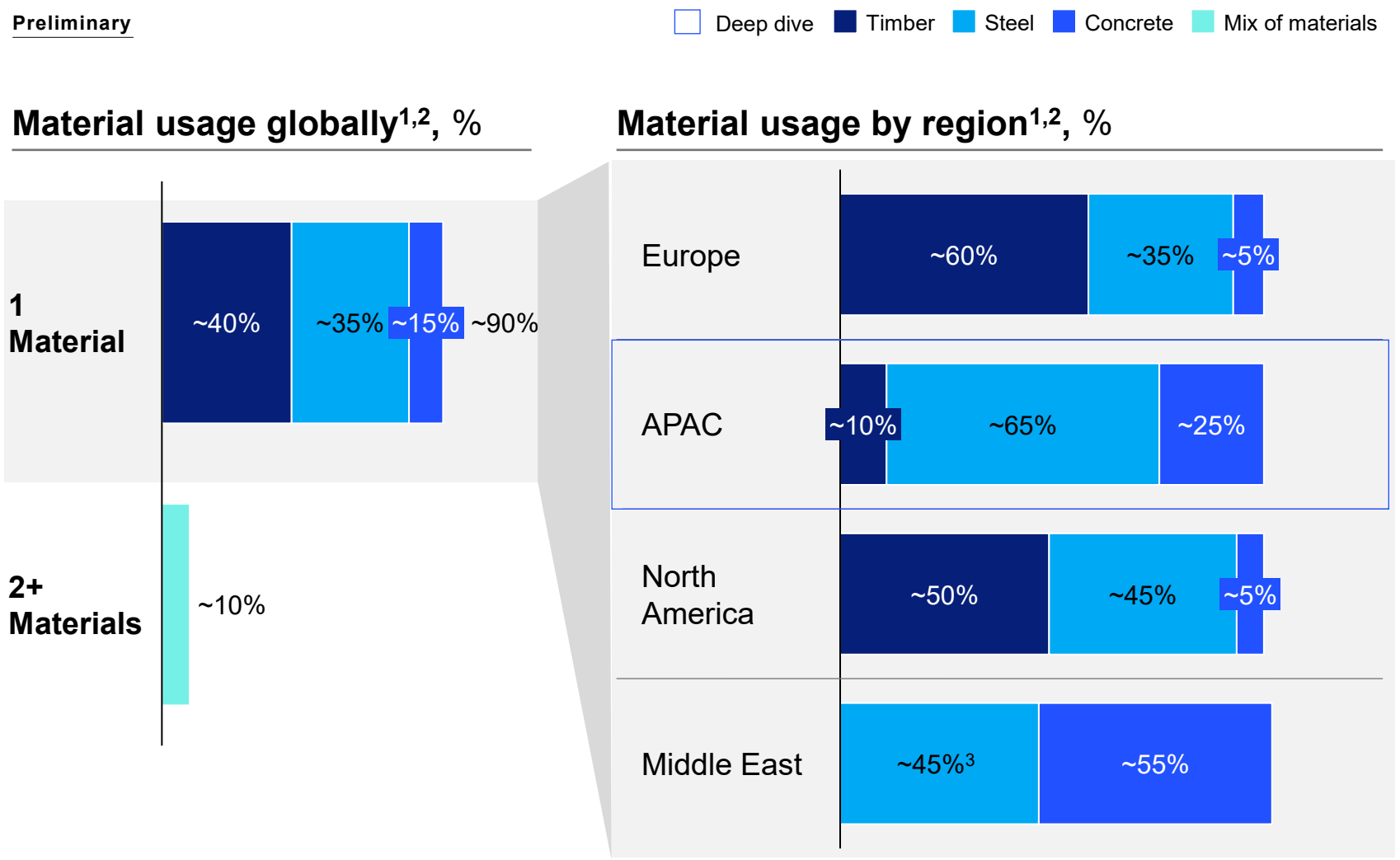
Overview of market share per archetype along key steps of modular construction value chain

Archetype	Description	Development	Design	Manufacturing	Assembly	Companies, %	Avg. Size, USD mn	Avg. EBITDA margin, %
Integrated modular developer	Manage and own the building process, while leveraging sub-contractors for parts of the building process	■	■	■	■	5-15	480-530	~9%
Contractors with modular capabilities	General contractor – leveraging modular construction methods for parts of their portfolio		■	■	■	0-5	660-880	~6%
Modular EPC	General contractor – exclusively leveraging modular construction methods and have their own manufacturing		■	■	■	35-45	110-180	~10%
Modular manuf. and assembly	Subcontractor – manufacturer with offsite factory for production and teams for assembling on the construction site			■	■	15-35	110-180	~17%
Modular manufacturer	Sub-contractor – design in-house and manufactures modular components before shipping them to construction site			■		10-20	45-90	~6%
Specialized modular companies	Specialized sub-contractor – focus on selected activities in the value chain (e.g., design, electrical)		▨	▨	▨	10-25	45-90	~12%

Source: McKinsey Modular Construction proprietary database, July 2025

C. Most companies focus on one structural material, but preferred material varies by region

Preliminary



Key insights

>90% of companies focus on a single building material as the main structural building material, with timber and steel being significantly more prevalent than concrete

Preferred building materials differ by region, Europe and North America prefer timber with ~55% and ~50% usage respectively, whereas APAC and the Middle East favor steel and concrete with ~60% steel and ~55% concrete respectively

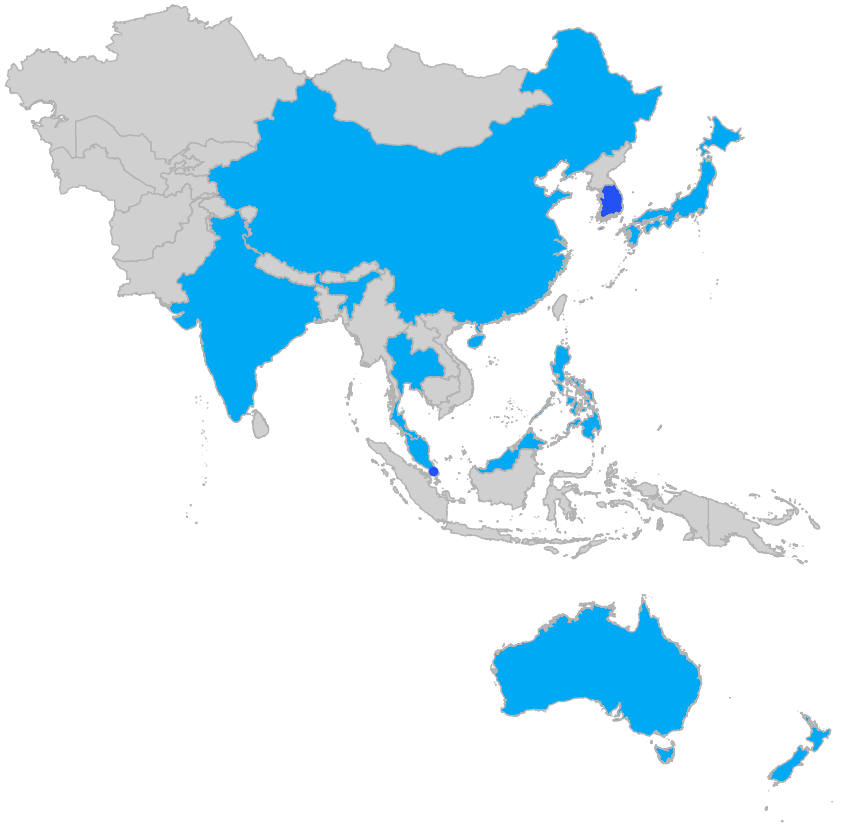
1. Including companies focusing on relocatable units, 2. Estimated based on number of companies using different materials, 3. Primarily temporary assets

Source: Modular Construction proprietary database, September 2024

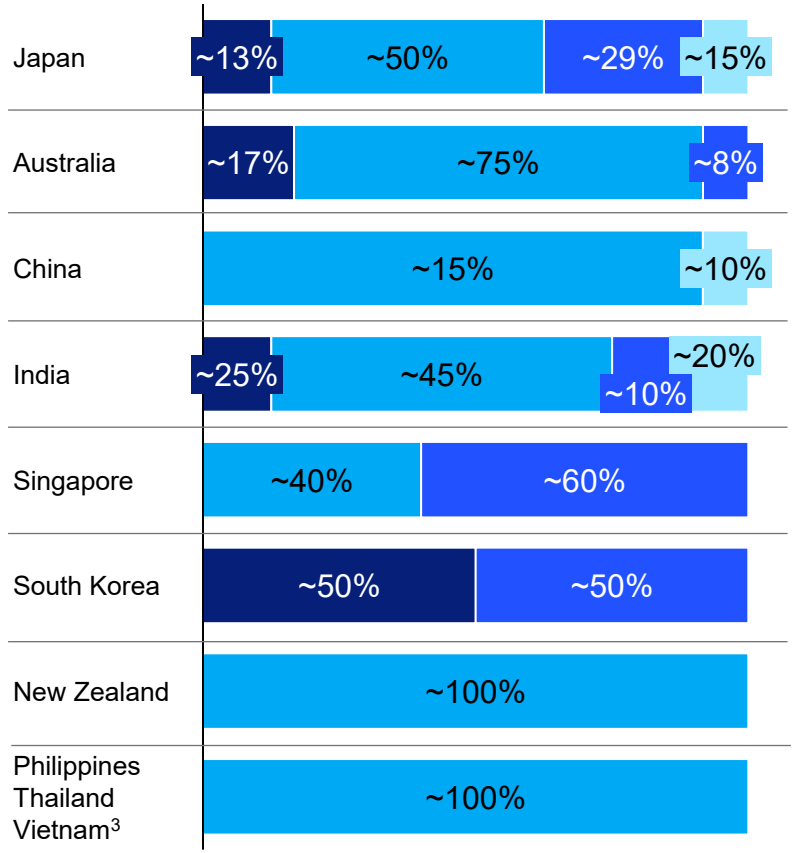
C. Majority of Asia countries rely on steel, but some countries focus on concrete

Preliminary

Materials use in Europe[1,2]



Share of material used for selected countries[1,2], %



Key insights

Material preferences are typically driven by factors such as local resource availability, historical building practices, climate considerations, and regulatory environments

Steel is the favored material across Asia, particularly in the South-East **,** whereas **concrete** predominant in Singapore, while South Korea, Australia, India and Japan also have some usage of Timber

1. Including companies focusing on relocatable units, 2. Estimated based on number of companies using different materials 3. Each country with 1 company

Source: Modular Construction proprietary database, September 2024, 2. McKinsey (2019): Value Creation in European building materials – where do the opportunities lie?

D. In Asia, multiple companies exist in both 2D and 3D modular, with 2D players often being larger

Preliminary

Product technology[1,2]	Description	Share of revenues[3], %	Share of companies[3], %	Average revenues[3], USD mn	Average EBITDA margins
2D elements	Flat-packed panels for walls, floors, and roof sections, assembled on-site to create various building solutions	~50%	70-80%	130-220	10-15%
3D volumetric	Fully pre-fabricated volumetric modules, transported and assembled on-site for rapid construction and high-quality control	~50%	30-40%	165-280	5-10%
Pods[4]	Pre-fabricated, self-contained units built off-site, installed in buildings for quick, consistent construction	0%	7%	0	0%

1. Including companies focusing on temporary units, 2.Main product technology, companies can use multiple product technologies, 3. Based on companies in the database with 2022 financials available, 4. Bathroom and/or kitchen

Source: McKinsey Modular Construction proprietary database, July 2025

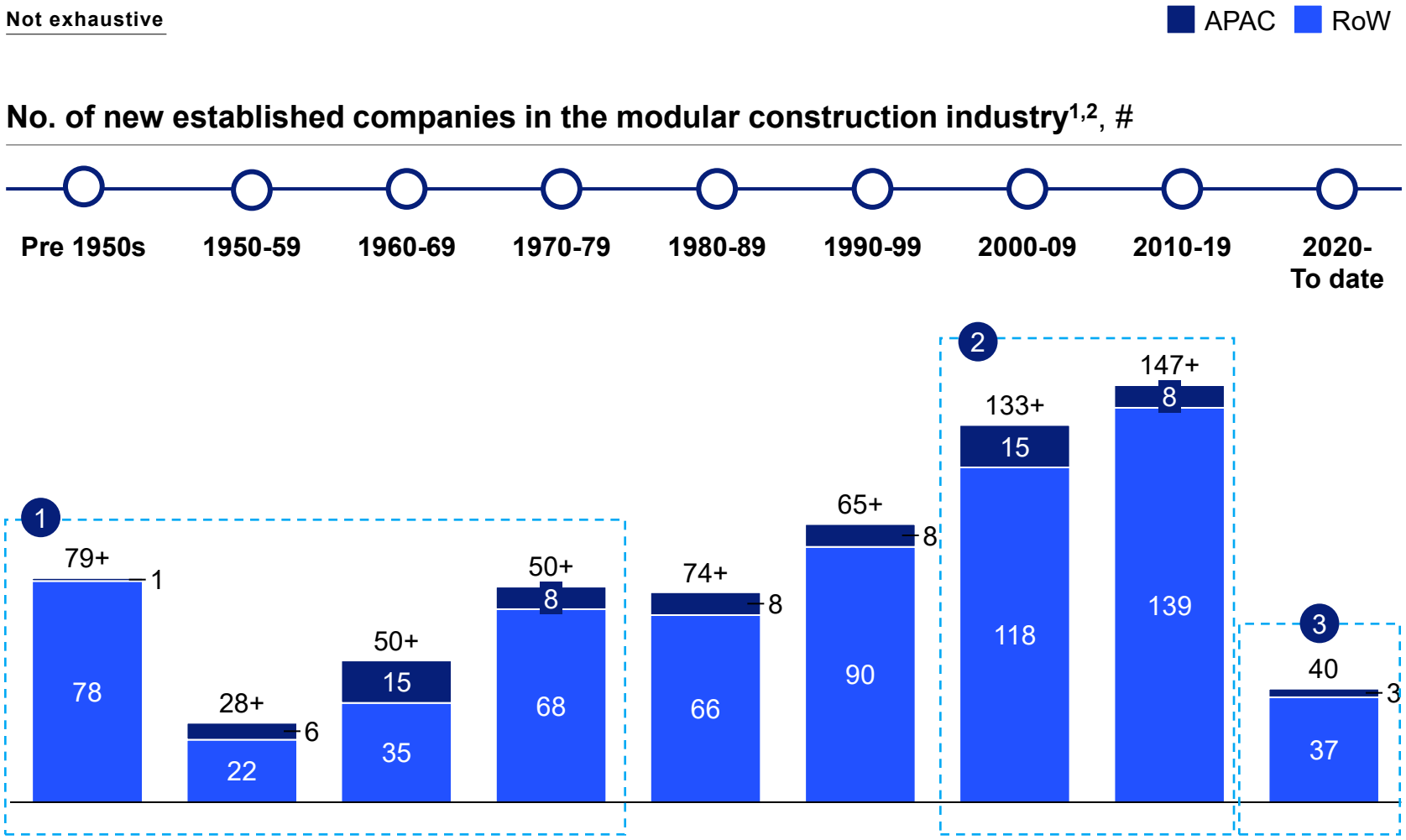
E. Low complexity modules with the highest profitability, followed by medium complexity

Preliminary

Source: McKinsey Modular Construction proprietary database, July 2025

Multiple players have operated for 50+ years – Asian companies represented in each decade

Not exhaustive



1. Only including active companies, 2. Some companies have not been active in modular in all years since the foundation

Source: McKinsey Modular construction model, July 2025

Key insights

1. **Over 200 companies have been operational for at least 50 years,** indicating a long history for modular construction

2. **>300 companies have been founded in the last 20 years,** showing the growing importance in the modular construction industry

3. **The modular construction market has seen a decline in activity in the last 5-years**, following a broader trend in the construction market

However, over the last 5 years some modular players have encountered challenges

Key reasons companies have gone bancrupt		Examples	
Liquidity challenges	Financial distress due to amount of capital tied up in projects which leads to challenges if payment terms are not optimized, or payments are delayed	ilke HOMES	Concerns over the rate of cash burn
		LEHTO ECONOMICALLY DRIVEN CONSTRUCTION	Subsidiaries were no longer financially able to continue operations
		Veev	Did not succeed in securing additional funding
Low factory utilization rates	Unable to generate sufficient / predictable revenue	house by urbansplash	Low factory utilization rates
Premature scaling	Early investment in expensive facilities requiring up front capex investments, w/o securing sufficient demand for building system	KATERRA	Scaling business too fast without tested and tried product
		Legal & General MODULAR HOMES	Unable to secure sufficient pipeline of projects
Lack of focus	Limited standardized in production process, unable to drive down costs due to broad focus	KATERRA	Lack of focus on unique business offer
Design issues	Unable to change design process to fit modular, overspecifications and inefficiencies in production process leading to defects, re-work and higher costs	house by urbansplash	Design issues resulting in production defects
Increase in raw material cost	Unable to translate increased cost into higher prices	Caledonian Modular	Rising material costs Delays caused by Covid

Source: Expert interviews, Press search

Key takeaways

Recent bankruptcies indicate key focus areas for modular construction companies to pay attention to going forward:

- Where to play – product and geography
- Iterative building design process
- Operational excellence
- Financial responsibility
- Scaling with demand

Despite the challenges, several companies are also succeeding

Selected examples

Company	Description	Key reason for Success
GOLDBECK	Specializing in prefabricated systems for schools, offices, and residential buildings, leveraging decades of expertise and innovation in modular construction	• **Utilize comprehensive in-house capabilities allowing design and production of up to 80% of components,** gradually scaled ensuring high quality and efficiency • **Maintain regional presence with over 80 sales offices** that ensures close market proximity and client engagement
SIBS	Focusing on fully modular turnkey solutions, with production in Malaysia and supply to Sweden and Saudi Arabia	• **Perform manufacturing of modular units in an integrated value chain and builds 90% of a building on one factory** ensuring high quality and speed • **Focus on specific building types within markets** to gain deep expertise
Portakabin	Leasing focused modular and offsite construction specialist operating across ten European countries, providing versatile solutions for various sectors	• **Operate with dual business model – main business in rental, with some sales** ensuring diversified revenue, capture a high-margin business, and improve plant utilization • **Positioned as a premium provider of durable and reliable** high-quality structures
Daiwa House Group	Specializing in prefabricated houses with presence in Asia, US, Oceania and Europe	• **Original local focused with specific building system,** significant experience and proof of concept before scaling operations globally • **Offer a diverse portfolio** across residential, commercial, and industrial sectors
VISION MODULAR SYSTEMS UK LTD	Focusing on the modular construction of high-end, high-rise buildings with efficient off-site prefabrication methods	• **Focus on high-quality high-rise residential and hotel projects in London,** leveraging labor cost differences and efficient off-site prefabrication outside the city • **Strong partnerships and value chain integration,** collaborating with Tide Construction and the developer Greystar

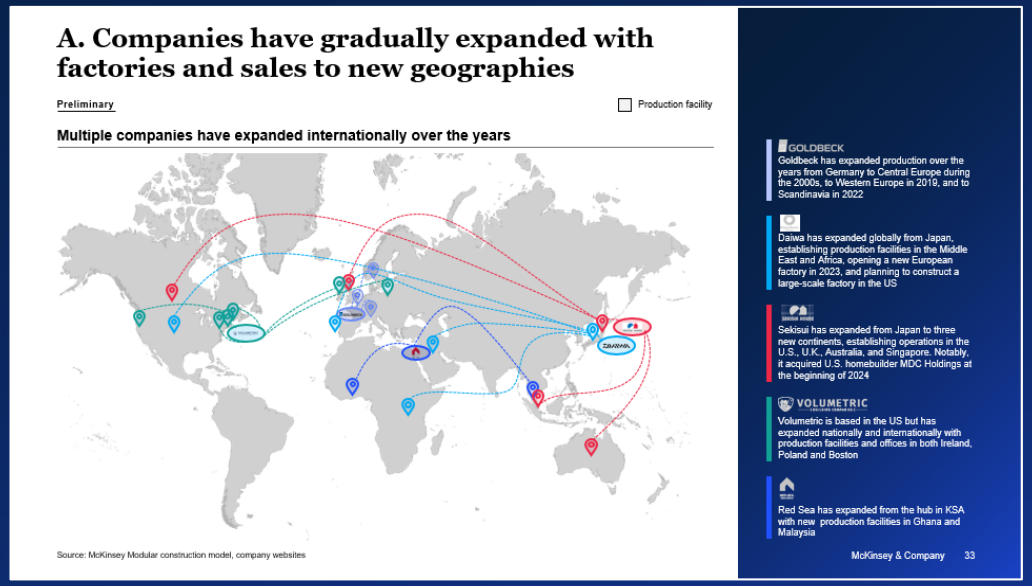
Source: Expert interviews, Company websites

The industry has started to internationalize

What we observe

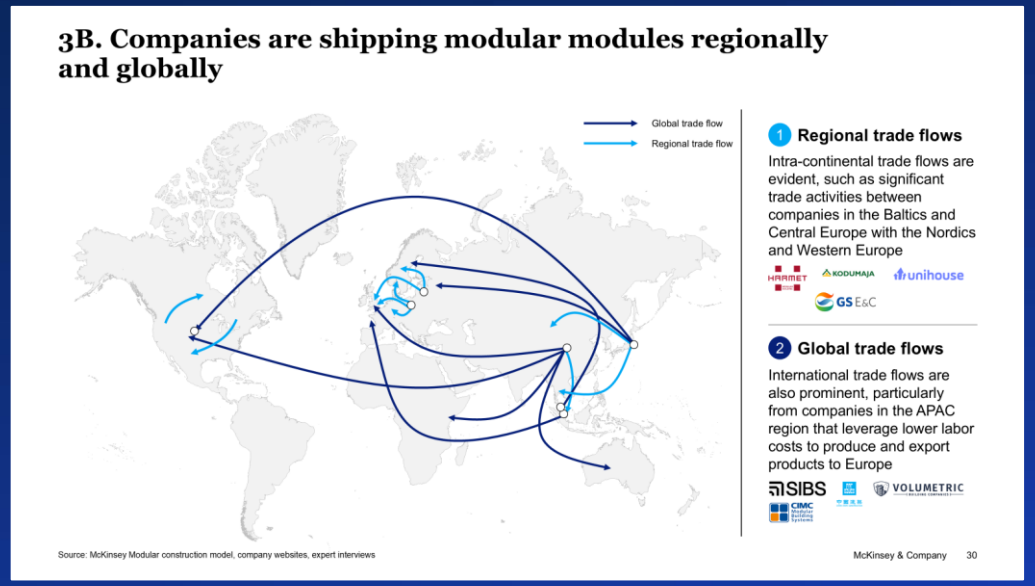
A Expanding presence across countries with new factories and sales

International expansion through new factories and sales presence highlights a strategic effort to capture new markets, increase production capacity, and enhance global competitiveness across the industry



B Global shipping of modular modules

Companies optimize costs and logistics by shipping modules regionally and globally, with notable trade between Baltics-Nordics/Western Europe and APAC-Europe



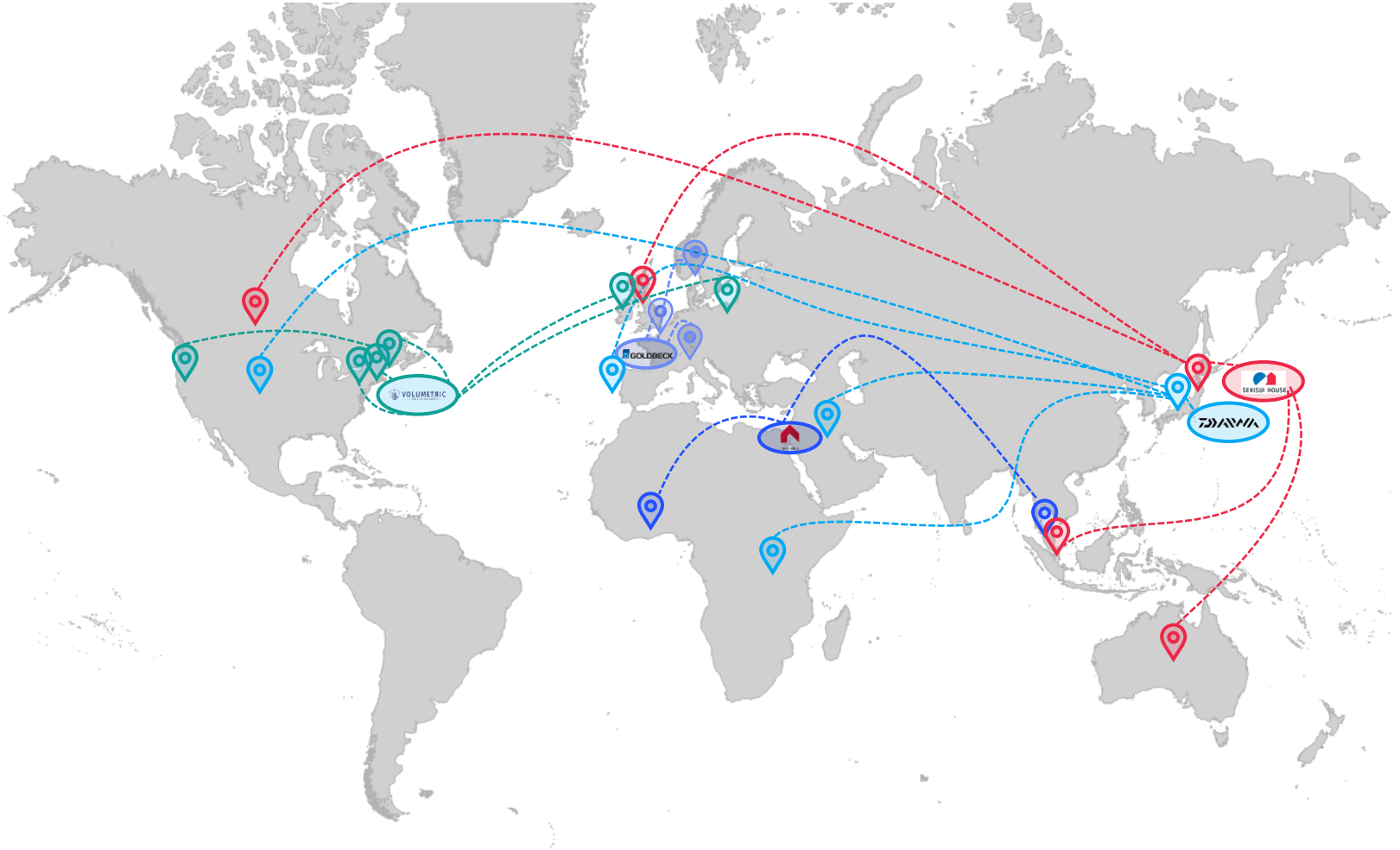
Source: McKinsey Modular construction model, company websites

A. Companies have gradually expanded with factories and sales to new geographies

Preliminary

Production facility

Multiple companies have expanded internationally over the years



Source: McKinsey Modular construction model, company websites

GOLDBECK

Goldbeck has expanded production over the years from Germany to Central Europe during the 2000s, to Western Europe in 2019, and to Scandinavia in 2022

Daiwa has expanded globally from Japan, establishing production facilities in the Middle East and Africa, opening a new European factory in 2023, and planning to construct a large-scale factory in the US

SEKISUI HOUSE

Sekisui has expanded from Japan to three new continents, establishing operations in the U.S., U.K., Australia, and Singapore. Notably, it acquired U.S. homebuilder MDC Holdings at the beginning of 2024

VOLUMETRIC BUILDING COMPANIES

Volumetric is based in the US but has expanded nationally and internationally with production facilities and offices in both Ireland, Poland and Boston

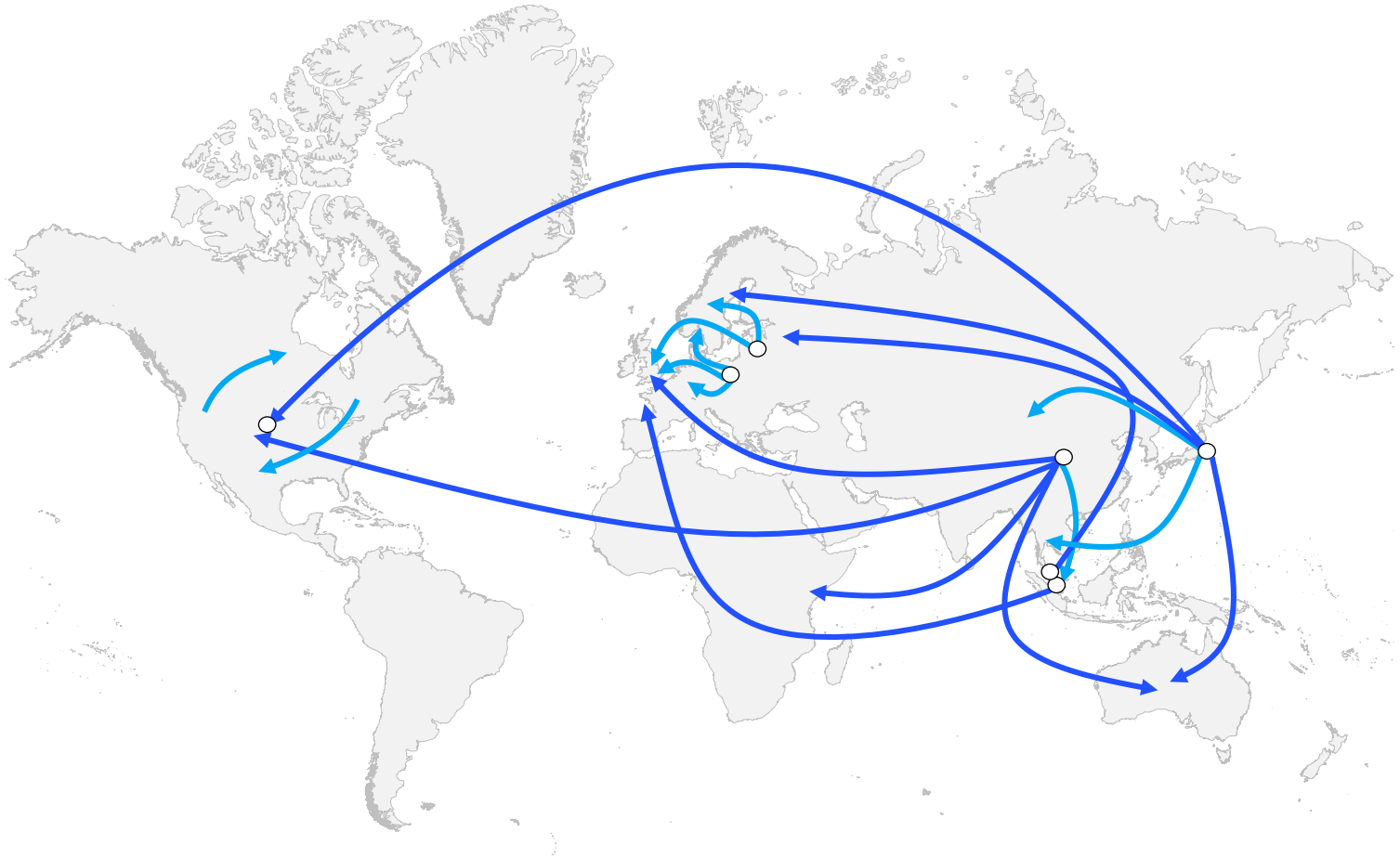
Red Sea has expanded from the hub in KSA with new production facilities in Ghana and Malaysia

B. Companies are shipping modular modules regionally and globally

Preliminary

Global trade flow Regional trade flow

Trade flow overview



Source: McKinsey Modular construction model, company websites, expert interviews

1 Regional trade flows

Significant trade activities between companies in the Baltics and Central Europe with the Nordics and Western Europe

2 Global trade flows

International trade flows from APAC region to Europe due to low labor and export cost

1. General overview of modular construction market

2. Current state of modular construction industry

3. What it takes to succeed

Three common traits observed for companies succeeding in Modular Construction

Building system at the core

Building system that cover the whole building and construction process

- **Developed a complete building system** that guides the entire process - design, manufacture, and assembly optimized for DfMA methodology
- **Systems with a standardized core**, while allowing for increments of flexibility to ensure the product fit a broad enough customer group
- **A configurator** based on the building system to efficiently do development, sale and design
- **Continuously iterate and evolve** the building system based on the learnings for projects

Value chain control

Steer key areas, integrate and foster collaboration

- **Development and early-stage design** optimize for modular / DfMA, enabled through building system and configurator
- **Tight collaboration and/or integration** across the entire value chain to sync processes, create transparency, rapidly handle updates, and algin incentives
- **Digital integration** of activities from development to assembly
- **Establish learning cycles** along the value chain to drive continuous improvement in every step

Focused scaling

Strategic focus and demand – driven growth

- **Focus on a successful and profitable proof of concept in one marke**t before expanding, i.e., specific building type, geography, or material, and avoid falling in temptation of doing projects which do not fit modular solution
- **Ensure there is sufficient, stable demand** before expanding capacity, and be considerate on pay-back times required for automation
- **Consider a mixed sales and rental business** model to allow for broader revenue base, and to balance factory utilization

Source: Expert interviews

Different set of opportunities for the different stakeholders in the modular construction space

	Developers	Contractors	Modular construc-tion companies	Investors	Governments
Opportunity	Higher IRR and quality of developments, while reducing risk of time and cost overruns	Reduced risk and skilled labor dependency, with opportunity to improve margins and attain competitive advantage	Opportunity to take a leading position in a large market, and create a high-growth profitable company	Potential to take position with high growth in the world's largest industry	Contribute to resolving housing shortages, address labor shortages, while enabling a new industry
Key topics to get clarity on	1 Potential value from modular across portfolio 2 Preferred building system and capabilities required 3 Buy, build or partner decisions 4 Potential partners (and/or targets) to deliver on solution 5 How to architect and operationalize a system to learn between projects	1 The potential of applying modular across different types of projects 2 An architecture for how to deliver projects leveraging modular 3 Requirements and potential partners 4 Roadmap for how to leverage modular and plan for initial projects	1 Areas of focus, incl Segments geographies customers and types of modular 2 Building system, capability requirements and roadmap 3 How to scale in a structured way (while minimizing risk)	1 Understanding of the modular construction market and value pockets 2 Opportunity (incl the whole ecosystem) and investment thesis 3 Performance of the asset, primarily versus key success factors and pitfalls in modular, and performance vs traditional construction	1 Asses stake, and bottlenecks prohibiting modular to scale 2 Enablers required to scale modular 3 Potential of modular vs investment required and plan for how to mobilize

Source: Expert interviews

McKinsey & Company

Thank you for your attention

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